Implementing Water Quality Strategies in Central Texas

Low Impact Development or Managing Stormwater with Green Infrastructure

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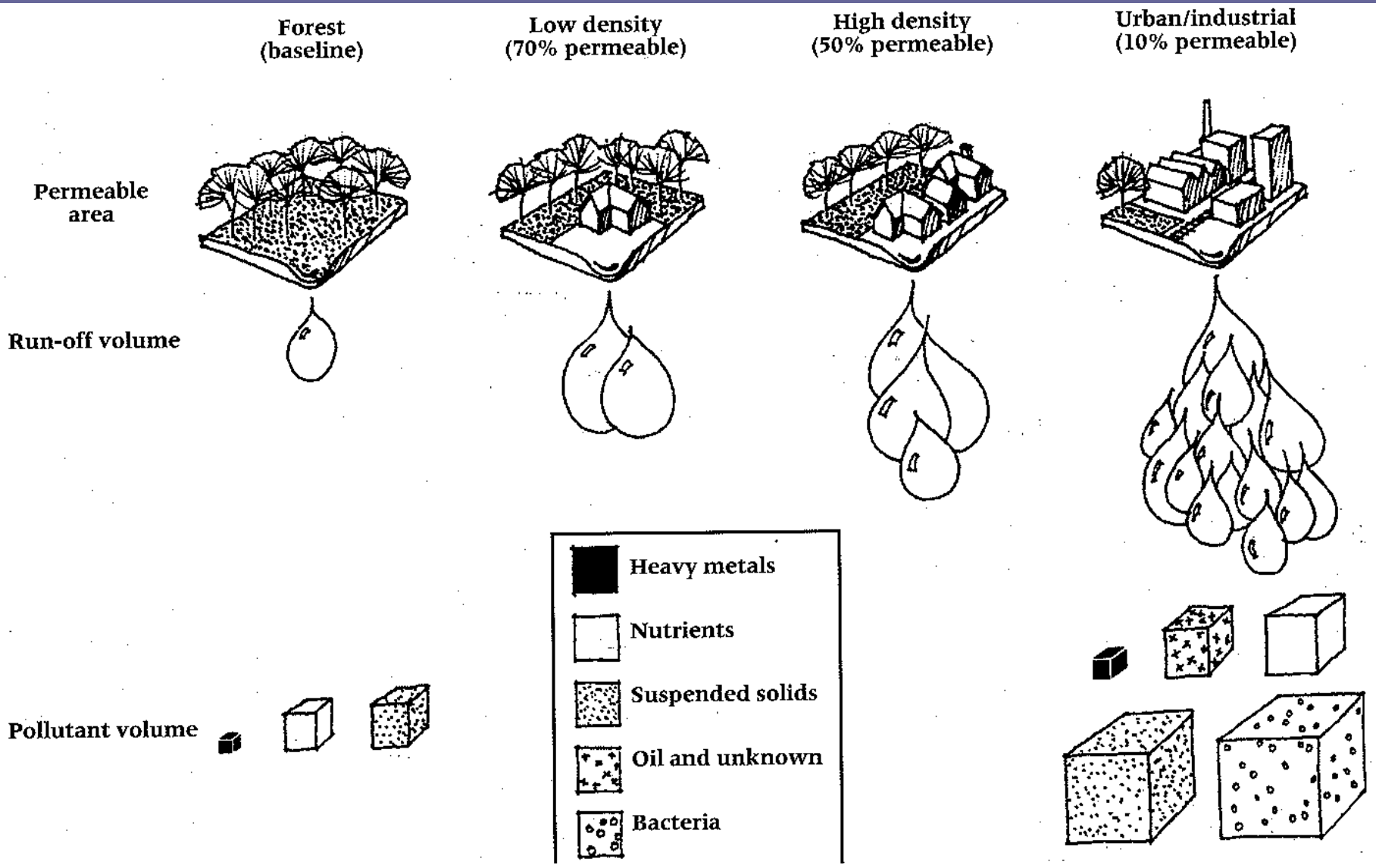
City of San Antonio

Impact of Development on a Site's Hydrology



Steps in Development

- Site Assessment
  - Existing topography/drainage
  - Existing soils
  - Existing trees to meet Tree Preservation ordinance
- Building and parking design
- Drainage design for entire site to meet drainage requirements
- Create landscape plan to used preserved tree and to meet Landscape ordinance requirements

Low Impact Development

- Low Impact Development (LID) is a new approach to managing stormwater runoff on-site. The basic principle is to model after nature; manage rainfall at the source using uniformly distributed, decentralized, micro-scale controls.
- The goal of LID is to mimic a site's predevelopment hydrology by utilizing various Integrated Management Practices (IMPs) that infiltrate, store, evaporate, and detain runoff close to the source.
- Outcomes are reduced stormwater runoff, improved water quality and increased soil moisture and aquifer water levels

Basic Principles

- Treat water as a resource, not a waste product
- Collaboration may be necessary
- Design to mimic or replicate the natural hydrology of a site
- Design to address issues of water quality, quantity and amenity
- Infiltrate, detain, retain
- Accommodate the standards and expectations of the client and the local community
- Start small, build from there

Basic Principles

Integrated Management Practices

- Site – combine drainage and landscape areas to meet code requirements
  - Preserve “natural” areas to capture and infiltrate stormwater
  - Create infiltration areas
- Building
  - Landscaped roofs
  - Rain collection systems
  - Disconnect gutter downspouts from buildings

Preserve Existing Vegetation/Drainage

Create Infiltration Areas

- Swales
- Bioretention areas
- Rain Gardens
- Landscape infiltration trenches/strips
- Porous pavement
- Structured tree boxes
- Structured filters

Swales

A LID swale (below) has an engineered design to increase infiltration such with use of “structured” soils or an underdrain.

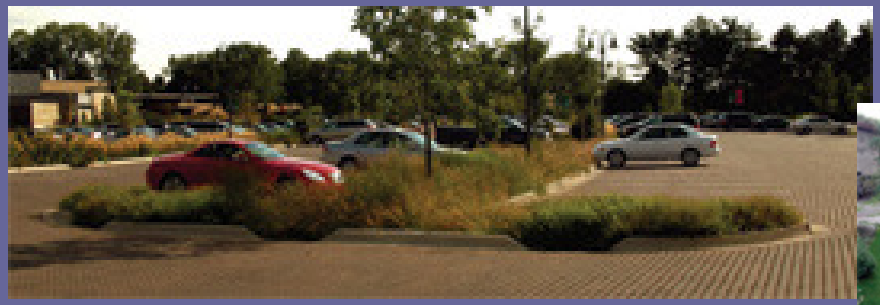
Grassed drainage channels (above) are not engineered to provide infiltration. They primarily serve to convey water

Bioretention and or Filtration

Landscape Strips with Sawtooth Curb

This parking lot directs stormwater to the infiltration area to reduce curb and gutters and a direct storm sewer connection to the creek

Landscape Infiltration Trips for Inner City Sites

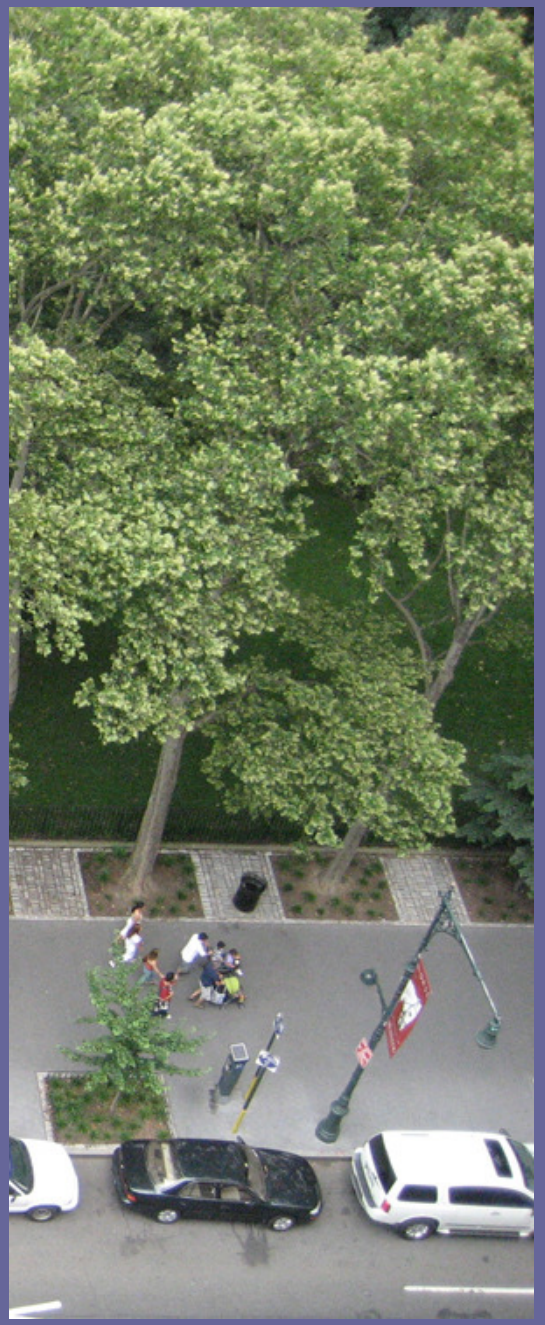


Infiltration Trench and Porous Pavers

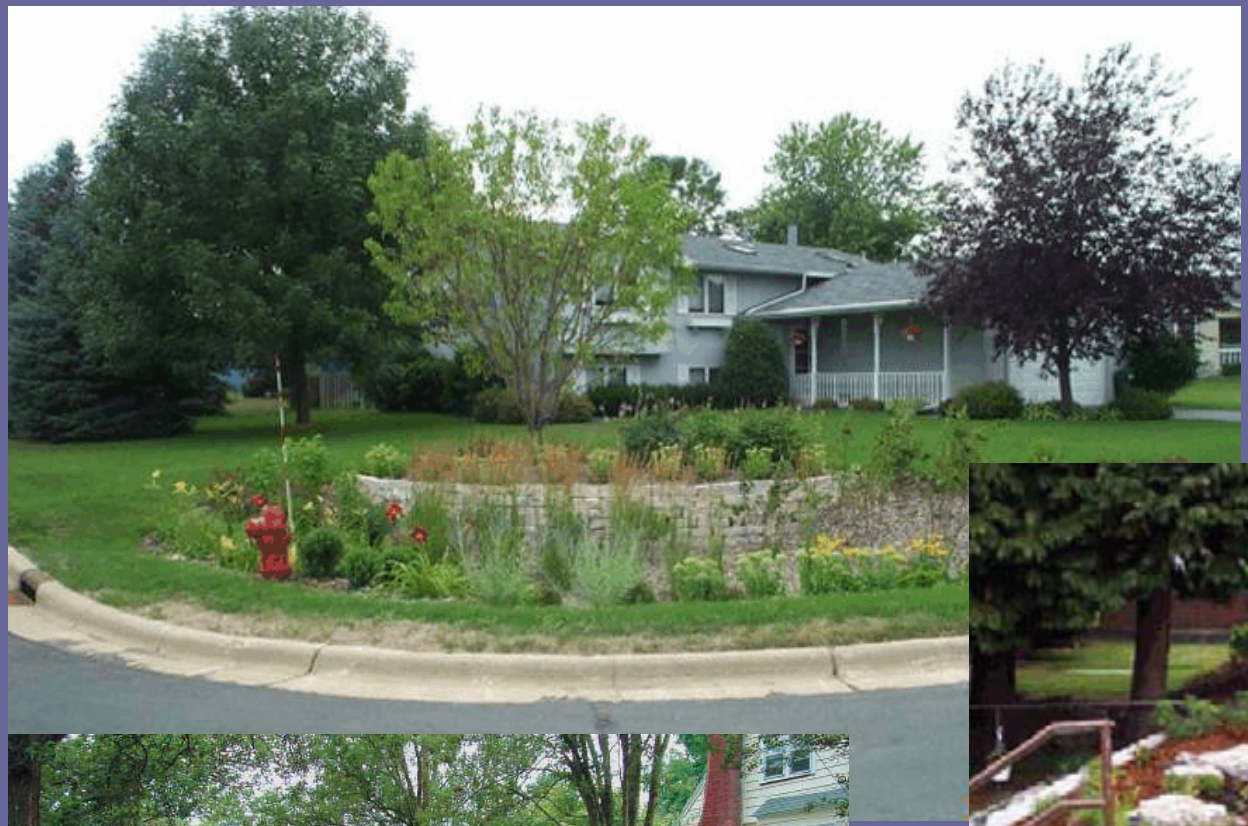
Green Alleys

Streetscapes that capture and filter stormwater

Use of Tree Areas and a Gravel Drain



Rain Gardens and Street Landscape Strips



Treatments for Small Areas

Filterra® and Bacterra™ Stormwater Bioretention Filtration Systems

Total suspended solids, phosphorus and or bacteria treatment

Treating Runoff in an Urban Watershed

Below-grade concrete container, 3” mulch, 1.5’ to 3.5’ filter media, cleanout, underdrain and suitable plant. Filterra®

Urban-runoff retrofit units being installed at the edge of sidewalks

ZPG media in cartridges; blend of Perlite, Zeolite, and Activated Carbon to eliminate pollutants.

CONTECH® CONSTRUCTION PRODUCTS INC.

Building Considerations

- Landscaped Roofs
- Rain Harvesting
- Disconnecting gutters

Landscaped Rood in Chicago, IL

A roof that is planted with vegetation can capture, store and use stormwater while reducing energy use of a building

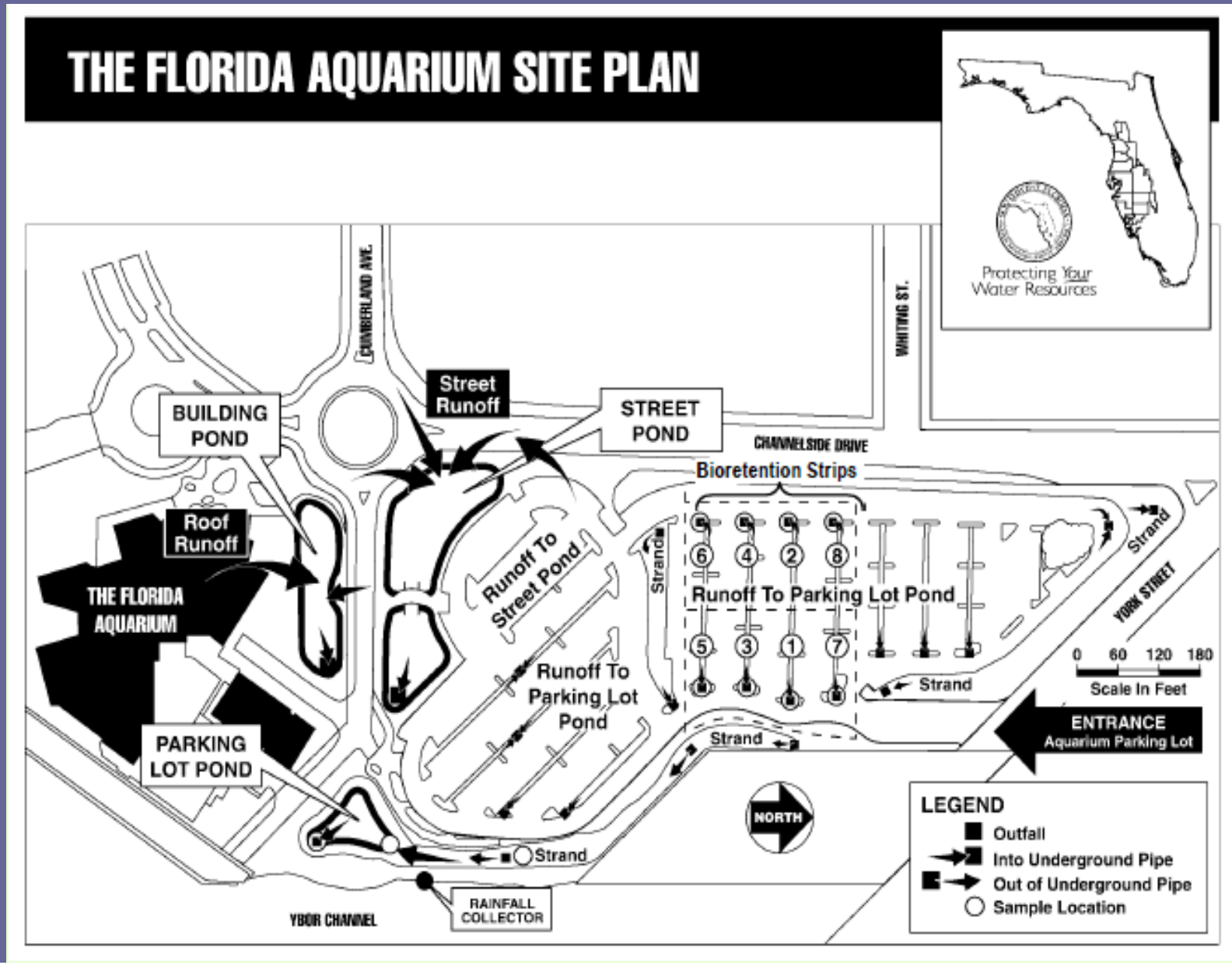
Rain Harvesting

Rain Barrels

Storage in a limited space

Cistern

Site Plan


THE FLORIDA AQUARIUM SITE PLAN
Protecting Your Water Resources
CUMBERLAND AVE.
WHITING ST.
BUILDING POND
Street Runoff
STREET POND
CHANNELSIDE DRIVE
Bioretention Strips
Roof Runoff
THE FLORIDA AQUARIUM
Runoff To Street Pond
Strand
6 4 2 8
Runoff To Parking Lot Pond
5 3 1 7
YORK STREET
Strand
0 60 120 180
Scale In Feet
Runoff To Parking Lot Pond
Strand
Strand
ENTRANCE
Aquarium Parking Lot
PARKING LOT POND
NORTH
LEGEND
Outfall
Into Underground Pipe
Out of Underground Pipe
Sample Location
Strand
YBOR CHANNEL
RAINFALL COLLECTOR

The Green Infrastructure

Texas Trees Foundation

Green vs.

Gray

Infrastructure